

# AIR QUALITY STUDY

## STATE ROUTE 91 CORRIDOR IMPROVEMENT PROJECT

PM<sub>2.5</sub> AND PM<sub>10</sub> ANALYSES

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### A: PM<sub>2.5</sub> AND PM<sub>10</sub> EMISSION CALCULATIONS

## INTRODUCTION

LSA Associates, Inc. (LSA) prepared this PM<sub>2.5</sub><sup>1</sup> and PM<sub>10</sub><sup>2</sup> hot-spot analysis for the State Route 91 (SR-91) Corridor Improvement Project (CIP) in response to the United States Environmental Protection Agency (EPA) releasing new PM<sub>2.5</sub> and PM<sub>10</sub> hot-spot analysis requirements in its March 10, 2006, final transportation conformity rule (71 FR 12468) (Final Rule). The 2006 Final Rule supersedes the Federal Highway Administration's (FHWA) September 12, 2001, "Guidance for Qualitative Project-Level Hotspot Analysis in PM<sub>10</sub> Nonattainment and Maintenance Areas." This analysis was conducted following the procedures and methodology provided in the "Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas" (EPA/FHWA Guidance) (EPA, 2006a).

This PM<sub>2.5</sub> and PM<sub>10</sub> analysis addresses the construction of the proposed project, including the following components identified in the Regional Transportation Plan (RTP) and the Regional Transportation Improvement Program (RTIP): Project ID: RIV071250; Description: SR-91 – Construct one mixed-flow lane and one auxiliary lane in each direction at various locations (State Route 241 [SR-241] to Pierce Street)(Orange County post mile [PM] 14.40 – 18.90), Collector-Distributor [CD] system (2 and 3 lanes from Lincoln Avenue to Interstate 15 [I-15]), one high occupancy toll [HOT] lane and convert high occupancy vehicle [HOV] lane to HOT lane in each direction (Orange County line to I-15); I-15 – construct HOV/HOT median direct connector junction SR-91/I-15 from northbound I-15 to westbound SR-91 and eastbound SR-91 to southbound I-15, construct 2 HOT lanes in each direction from SR-91 to Cajalco Road (I-15 PM 36.80 to 42.88).

## PROJECT LOCATION AND DESCRIPTION

The SR-91 CIP is located in Orange and Riverside Counties along the SR-91 corridor and includes connections to I-15 in Riverside County. The western project limits of SR-91 are located at the SR-91/State Route 241 (SR-241) interchange in the eastern part of the City of Anaheim in northeastern Orange County. The eastern project limits of SR-91 extend to Pierce Street in the City of Riverside, which is located just east of the City of Corona. The project limits along SR-91 span approximately 14 miles (mi). Refer to Figure 1 for the project vicinity. Refer to Figure 2 for the project location.

The study area along I-15 begins at Cajalco Road, which is located approximately 5 mi south of SR-91 in the City of Corona. The study area extends north to Hidden Valley Parkway, which is located approximately 1 mi north of SR-91 in the City of Corona. The study area will extend roughly 2 mi beyond the proposed project limits for SR-91 and I-15 to allow for the placement of advanced signage for express lane access and construction areas within the existing State right-of-way. Advance signage areas are shown on Figure 2.

In addition to a No Build Alternative, two Build Alternatives have been proposed. The Build Alternatives are: Alternative 1 (referred to as the Add General-Purpose Lanes [GP Lanes] Alternative) and Alternative 2 (referred to as the Add General-Purpose Lanes and Extend Express Lanes [GP + Express Lanes] Alternative).

<sup>1</sup> Particulate matter less than 2.5 microns in diameter.

<sup>2</sup> Particulate matter less than 10 microns in diameter.

Figure 1: Project Vicinity

Figure 2: Project Location

### **Alternative 1 – Add General-Purpose Lanes**

The GP Lanes Alternative would construct one general-purpose lane in each direction on SR-91 from the SR-91/SR-241 interchange in the City of Anaheim to Pierce Street in the City of Riverside. This alternative would keep the existing HOV lanes on SR-91 between the Orange/Riverside County line and Pierce Street in the City of Riverside. Alternative 1 would also construct one HOV lane on I-15 in each direction from Ontario Avenue in the City of Corona to a proposed I-15/SR-91 HOV lane direct connector. The HOV direct connectors would provide freeway access from northbound I-15 to westbound SR-91 and from eastbound SR-91 to southbound I-15. The HOV direct connectors would allow vehicles in the HOV lanes to transition directly from freeway to freeway, which would eliminate the existing transitions within the general-purpose lanes.

If Alternative 1 were selected, the existing 3 mi Orange County segment of the SR-91 express lanes, which is currently operating as an Express Lanes toll facility, would continue to serve this function.

### **Alternative 2 – Add General –Purpose Lances and Extend Express Lanes**

The GP + Express Lanes Alternative would construct one general-purpose lane in each direction on SR-91 from the SR-91/SR-241 interchange in the City of Anaheim to Pierce Street in the City of Riverside. This Alternative would extend the existing express lanes in Orange County to the east from the Orange/Riverside County Line to I-15 in the City of Corona. The existing HOV lanes would be converted to express lanes, and one additional express lane in each direction would be constructed. Under Alternative 2, the eastbound SR-91 express lane would extend to McKinley Street and then transition back to HOV lanes at Pierce Street.

An express lane in each direction would also be constructed on I-15 from Cajalco Road to Hidden Valley Parkway. Express lane direct connectors between I-15 and SR-91 would provide access from northbound I-15 to westbound SR-91 and from eastbound SR-91 to southbound I-15. Additionally, express lane direct connectors are proposed from eastbound SR-91 to northbound I-15 and from southbound I-15 to westbound SR-91. The direct connectors would allow the express lane drivers to turn from the express lanes on one corridor into a similar lane on another corridor. This would eliminate the transition of express lane traffic from freeway to freeway via the general-purpose lanes.

### **PM<sub>2.5</sub> AND PM<sub>10</sub> HOT-SPOT METHODOLOGY**

The new Final Rule establishes the transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in PM<sub>2.5</sub> and PM<sub>10</sub> nonattainment and maintenance areas. The proposed project is in the South Coast Air Basin (Basin), which has been designated as a federal nonattainment area for PM<sub>2.5</sub> and PM<sub>10</sub>; therefore, a hot-spot analysis for the proposed project is required.

A hot-spot analysis is defined in the Code of Federal Regulations (CFR) (40 CFR 93.101) as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. A hot-spot analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, such as for congested roadway intersections and highways or transit terminals. Such an analysis is a means of demonstrating that a transportation project meets the federal Clean Air Act (CAA) conformity

requirements to support State and local air quality goals with respect to potential localized air quality impacts. When a hot-spot analysis is required, it is included within the project-level conformity determination that is made by FHWA or the Federal Transit Administration (FTA).

Section 176(c)(1)(B) of the CAA is the statutory criterion that must be met by all projects in nonattainment and maintenance areas that are subject to transportation conformity. Section 176(c)(1)(B) states that federally supported transportation projects must not “cause or contribute to any new violation of any standard in any area; increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.”

The EPA in its *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas* (March 2006) has established the following two methods for completing PM<sub>2.5</sub> and PM<sub>10</sub> hot spot analyses:

- A. Comparison to another location with similar characteristics
- B. Air quality studies for the proposed project location

This analysis uses a combined approach to demonstrate that the proposed SR-91 CIP would not result in a new or worsened PM<sub>2.5</sub> or PM<sub>10</sub> violation. Method A was used to establish that under the no build condition the proposed project area will meet the national ambient air quality standards (NAAQS). Method B was used to demonstrate that the proposed project would not delay attainment of the NAAQS.

### Ambient Air Quality Standards

PM<sub>2.5</sub> nonattainment and maintenance areas are required to attain and maintain two NAAQS:

- **24-hour Standard:** 65 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). Based on 2004–2006 monitored data, the EPA tightened the PM<sub>2.5</sub> 24-hour standard from 65 to 35  $\mu\text{g}/\text{m}^3$ , effective December 2006. New area designations will become effective in early 2010 (EPA, 2006). Therefore, the current standard for conformity purposes is 65  $\mu\text{g}/\text{m}^3$ .
- **Annual Standard:** 15.0  $\mu\text{g}/\text{m}^3$

The current 24-hour standard is based on a three-year average of the 98th percentile of 24-hour PM<sub>2.5</sub> concentrations. The current annual standard is based on a three-year average of annual mean PM<sub>2.5</sub> concentrations. A PM<sub>2.5</sub> hot-spot analysis must consider both standards unless it is determined for a given area in which meeting the controlling standard would ensure that CAA requirements are met for both standards. The interagency consultation process should be used to discuss how the qualitative PM<sub>2.5</sub> hot-spot analysis meets statutory and regulatory requirements for both PM<sub>2.5</sub> standards, depending on the factors that are evaluated for a given project.

PM<sub>10</sub> nonattainment and maintenance areas are required to attain the following standard:

- **24-hour Standard:** 150  $\mu\text{g}/\text{m}^3$

The 24-hour PM<sub>10</sub> standard is attained when the average number of exceedances in the previous three calendar years is less than or equal to 1.0. An exceedance occurs when a 24-hour concentration of 155 µg/m<sup>3</sup> or greater is measured at a site. The annual PM<sub>10</sub> standard of 50 µg/m<sup>3</sup> is no longer used for determining the federal attainment status. The interagency consultation process should be used to discuss how the qualitative PM<sub>10</sub> hot-spot analysis meets statutory and regulatory requirements for the PM<sub>10</sub> standards, depending on the factors that are evaluated for a given project.

To meet statutory requirements, the 2006 Final Rule requires PM<sub>2.5</sub> and PM<sub>10</sub> hot-spot analyses to be performed for Projects of Air Quality Concern (POAQC). The Final Rule states that projects not identified in 40 CFR 93.123(b)(1) as POAQC have met statutory requirements without any further hot-spot analyses (40 CFR 93.116[a]).

## **PM<sub>2.5</sub> AND PM<sub>10</sub> HOT-SPOT ANALYSIS**

### **Projects of Air Quality Concern**

The first step in the hot-spot analysis is to determine whether a project meets the standard for a POAQC. The EPA specified in 40 CFR 93.123(b)(1) of the 2006 Final Rule that POAQC are certain highway and transit projects that involve significant levels of diesel vehicle traffic, or any other project that is identified in the PM<sub>2.5</sub> and PM<sub>10</sub> State Implementation Plan (SIP) as a localized air quality concern. The 2006 Final Rule defines the POAQC that require a PM<sub>2.5</sub> and PM<sub>10</sub> hot-spot analysis in 40 CFR 93.123(b)(1) as:

- i. New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
- ii. Projects affecting intersections that are at level of service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- iii. New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- iv. Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; or
- v. Projects in or affecting locations, areas, or categories of sites that are identified in the PM<sub>2.5</sub> and PM<sub>10</sub> applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The proposed project would meet the criteria in Items i and ii above, because it would expand an existing facility and affect local intersections with a significant number of diesel vehicles. Therefore, this project is considered to be a POAQC, and a qualitative project-level PM<sub>2.5</sub> and PM<sub>10</sub> hot-spot analysis was conducted to assess whether the project would cause or contribute to any new localized PM<sub>2.5</sub> or PM<sub>10</sub> violations, increase the frequency or severity of any existing violations, or delay timely attainment of the PM<sub>2.5</sub> and PM<sub>10</sub> AAQS.



## Types of Emissions Considered

In accordance with the EPA/FHWA Guidance, this hot-spot analysis is based on directly emitted and re-entrained PM<sub>2.5</sub> and PM<sub>10</sub> emissions. Tailpipe, brake wear, tire wear, and road dust PM<sub>2.5</sub> and PM<sub>10</sub> emissions were considered in this hot-spot analysis.

Vehicles cause dust from paved and unpaved roads to be re-entrained, or resuspended, in the atmosphere. According to the 2006 Final Rule, road dust emissions are to be considered for PM<sub>10</sub> hot-spot analyses. For PM<sub>2.5</sub>, road dust emissions are only to be considered in hot-spot analyses if the EPA or the State air agency has made a finding that such emissions are a significant contributor to the PM<sub>2.5</sub> air quality problem (40 CFR 93.102(b)(3)). The EPA has published a guidance on the use of AP-42 for re-entrained road dust for SIP development and conformity (August 2007); therefore, re-entrained PM<sub>2.5</sub> is considered in this analysis.

Secondary particles formed through PM<sub>2.5</sub> and PM<sub>10</sub> precursor emissions from a transportation project take several hours to form in the atmosphere, giving emissions time to disperse beyond the immediate project area of concern for localized analyses; therefore, they were not considered in this hot-spot analysis. Secondary emissions of PM<sub>2.5</sub> and PM<sub>10</sub> are considered as part of the regional emission analysis prepared for the conforming RTP and Federal Transportation Improvement Program (FTIP).

According to the project schedule, no phase of construction would last more than five years, and construction-related emissions may be considered temporary; therefore, any construction-related PM<sub>2.5</sub> and PM<sub>10</sub> emissions due to this project were not included in this hot-spot analysis. This project will comply with the applicable South Coast Air Quality Management District (SCAQMD) Fugitive Dust Rules for the control of fugitive dust during construction of this project. In addition, per Transportation Conformity Rule 93.117, the project will be required to comply with any applicable PM<sub>2.5</sub> and PM<sub>10</sub> control measures in the SIP. Excavation, transportation, placement, and handling of excavated soils will result in no visible dust migration. A water truck or tank will be available within the project limits at all times to suppress and control the migration of fugitive dust from earthwork operations.

## Analysis Method

According to the hot-spot methodology, estimates of future localized PM<sub>2.5</sub> and PM<sub>10</sub> pollutant concentrations need to be determined. This analysis makes those estimates by extrapolating present PM<sub>2.5</sub> and PM<sub>10</sub> pollutant concentrations from air quality data measured at monitoring stations in the vicinity of the proposed project. The data from these stations are combined with projections from the 2003 and 2007 Air Quality Management Plans (AQMP) prepared by the SCAQMD and examined for trends in order to predict future conditions in the project vicinity. Additionally, the impacts of the project and the likelihood of these impacts interacting with the ambient PM<sub>2.5</sub> and PM<sub>10</sub> levels to cause hot spots are discussed.

## Data Considered

The closest air quality monitoring station to the proposed project within the County of Riverside is the Norco station. This station is located within 4000 feet of I-15. However, this station only monitors PM<sub>10</sub> concentrations. The monitoring station closest to the project area that currently monitors PM<sub>2.5</sub> concentrations is the 1630 West Pampas Lane, Anaheim Station. This station is approximately 1,200

feet from Interstate 5 (I-5) and 1.3 miles from SR-91. The project location relative to these monitoring stations is shown in Figure 3.

The existing truck volumes along I-5 and SR-91 in the vicinity of the Anaheim monitoring station are 26,000 and 19,900 daily trips, respectively. The existing truck volume along I-15 in the vicinity of the Norco Station is 18,000 daily trips. These volumes are higher than the 16,500 to 18,000 daily truck trips along SR-91 and I-15, respectively, in the project area. The total vehicle trips along I-5, I-15, and SR-91 in the vicinity of these monitoring stations vary from 200,000 to 285,000, similar to or greater than the 200,000 to 272,000 existing daily trips along SR-91 and I-15, respectively, in the project area. Therefore, the air quality concentrations monitored at these stations are representative of the existing conditions in the project area.

**Trends in Baseline PM<sub>2.5</sub> Concentrations.** The monitored PM<sub>2.5</sub> concentrations at the Anaheim Station are shown in Table A. These data show that, within the past five years, the federal 24-hour PM<sub>2.5</sub> AAQS (65 µg/m<sup>3</sup>) was not exceeded. The annual average PM<sub>2.5</sub> AAQS (15 µg/m<sup>3</sup>) at this station was exceeded in four of the five years; however, the concentrations have been decreasing steadily overtime.

**Table A: Ambient PM<sub>2.5</sub> Monitoring Data (µg/m<sup>3</sup>)**

	2003	2004	2005	2006	2007
<b>Anaheim Air Quality Monitoring Station</b>					
3-year average 98th percentile	55.8	52.3	49.3	45.7	44.7
Exceeds federal 24-hour standard (65 µg/m <sup>3</sup> )?	No	No	No	No	No
3-year National annual average	20.43	17.63	16.33	15.21	14.35
Exceeds federal annual average standard (15 µg/m <sup>3</sup> )?	Yes	Yes	Yes	Yes	No

Source: EPA Web site: <http://www.epa.gov/air/data/monvals.html?st~CA~California>, March 2009.

**Projected 24-hour Concentrations.** The levels of PM<sub>2.5</sub> in the project vicinity are below the current federal 24-hour standard. Table V-2-16 in the 2007 AQMP estimates that the 24-hour PM<sub>2.5</sub> concentration at the Anaheim station will be 42.8 µg/m<sup>3</sup> in 2015. This concentration would not exceed the current federal 24-hour standard of 65 µg/m<sup>3</sup>.

**Projected Annual Concentrations.** While the current levels of PM<sub>2.5</sub> in the project vicinity are generally above the federal annual standard, indications are that levels in the future will continue to decrease. As shown in Table V-2-15c in the 2007 AQMP, the annual PM<sub>2.5</sub> concentration, with the California Air Resources Board's (ARB) emission reduction plan and the SCAQMD's emission reduction overlay, at the Anaheim Station is projected to be 12.3 µg/m<sup>3</sup> in 2014. This concentration would not exceed the federal annual standard of 15 µg/m<sup>3</sup>.

Figure 3: SCAQMD Monitoring Stations

**Trends in Baseline PM<sub>10</sub> Concentrations.** The monitored PM<sub>10</sub> concentrations at the Norco Station, shown in Table B, indicate that the federal 24-hour PM<sub>10</sub> AAQS (150 µg/m<sup>3</sup>) was exceeded once in 2007.

**Table B: Ambient PM<sub>10</sub> Monitoring Data (µg/m<sup>3</sup>)**

	2003	2004	2005	2006	2007
<b>Norco Air Quality Monitoring Station</b>					
First Highest	116	76	79	74	332
Second Highest	79	72	64	71	93
Third Highest	68	72	59	67	92
Fourth Highest	67	70	57	66	87
No. of days above national 24-hour standard (150 µg/m <sup>3</sup> )	0	0	0	0	1

Source: ARB Web site: <http://www.arb.ca.gov/adam/welcome.html>, July 2009.

The 2007 AQMP reports that since the federal annual PM<sub>10</sub> standard has been revoked, the Basin is expected to be declared in attainment for the 24-hour federal PM<sub>10</sub> standard since 2000. Table V-3-1 in the 2007 AQMP lists the projected 24-hour PM<sub>10</sub> concentrations at various stations within the Basin. It is estimated that the 24-hour concentration at the Anaheim Station (the closest station to the project area listed in the AQMP) will be 78 µg/m<sup>3</sup> by 2015, 52 percent of the federal standard.

### Transportation and Traffic Conditions

Existing, interim (2015), and future (2035) no build average daily traffic (ADT) volumes and average daily truck volumes for SR-91 and I-15 in the project area are shown in Table C. The table indicates that SR-91 and I-15 each currently experience more than 10,000 trucks annual average daily traffic (AADT).

**Table C: Existing and No Build Average Daily Traffic Volumes (Truck Average Daily Volumes)**

Roadway Link	Existing (2007)	2015 No Build	2035 No Build
SR-91 from SR-241 to SR-71	280,000 (15,500)	320,000 (17,500)	325,000 (18,900)
SR-91 from SR-71 to I-15	272,000 (14,500)	306,000 (16,800)	306,000 (16,800)
SR-91 east of I-15	224,000 (16,300)	239,000 (18,400)	273,000 (21,800)
I-15 north of SR-91	171,000 (17,900)	198,000 (23,000)	320,000 (31,600)
I-15 south of SR-91	201,000 (10,300)	243,000 (13,500)	337,000 (20,500)

Source: PB, April 2009.

Table D summarizes the existing level of service (LOS) for the intersections along SR-91 and I-15 in the project area. As shown, the LOS currently vary from LOS A to LOS F.



**Table D: Existing Intersection LOS**

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	Delay	LOS	Delay	LOS
1. Green River Rd/SR-91 WB Ramps	170.8	F	12.0	B
2. Green River Rd/SR-91 EB Ramps	11.8	B	14.6	B
3. Auto Center Dr/SR-91 WB Ramps	34.9	C	13.6	B
4. Maple St/Pomona Dr	9.3	A	9.6	A
5. 6th St/SR-91 EB Ramps	21.9	C	137.4	F
6. Paseo Grande/6th St	28.1	C	47.2	D
7. SR-91 WB Ramps/Pomona Rd	224.9	F	36.5	D
8. Lincoln Ave/SR-91 EB Ramps	22.1	C	243.1	F
9. Main St/Grand Blvd	23.9	C	28.7	C
10. Main St/SR-91 WB Ramps	36.1	D	40.1	D
11. Main St/3rd St	24.9	C	39.7	D
12. McKinley St/Griffin Way	36.7	D	175.9	F
13. McKinley St/Sampson Ave	28.7	C	93.8	F
14. Pierce St/Magnolia Ave	32.2	C	105.2	F
15. Hamner Ave/Hidden Valley Pkwy	63.0	E	143.0	F
16. Rimpau Ave/Magnolia Ave	98.7	F	94.9	F
17. El Sobrante/Magnolia Ave	168.0	F	65.4	E
18. I-15 SB Ramps/Magnolia Ave	63.4	E	64.3	E
19. I-15 SB Ramps/Ontario Ave	35.6	D	29.1	A
20. Bedford Canyon/Cajalco Road	11.4	B	73.3	E

Source: PB, April 2009.

Delay = Stopped time delay at intersection in seconds

LOS = Level of service

### Traffic Changes Due to the Proposed Project

The proposed project is a highway improvement project that will increase the capacity of SR-91 and I-15. Based on the Traffic Study (PB, April 2009), the proposed project would increase peak hour and daily traffic volumes on SR-91 and I-15. The future traffic volumes for 2015 and 2035 are shown in Tables E and F, respectively. The with project reduction in traffic along SR-91 east of I-15 is due to the proposed HOV connectors that would separate traffic from SR-91 until after McKinley Street where traffic volumes are lower.

Tables G, H, I, and J show the 2015 and 2035 LOS in the project area for the a.m. and p.m. peak hours. As shown, the proposed project would worsen the LOS at various intersections along the project alignment.

**Table E: 2015 Highway Traffic Volumes**

Roadway Link	No Build		Build Alternative 1		Build Alternative 2	
	ADT	Truck ADT	ADT	Truck ADT	ADT	Truck ADT
SR-91 from SR-241 to SR-71	320,300	17,500	329,600	18,100	333,500	18,300
SR-91 from SR-71 to I-15	305,900	16,400	310,400	16,800	327,300	17,700
SR-91 east of I-15	243,300	18,400	235,400	18,100	238,900	18,400
I-15 north of SR-91	201,500	23,000	208,400	24,200	209,600	24,300
I-15 south of SR-91	242,700	13,500	248,800	13,900	251,800	14,100

Source: PB, April 2009.

ADT = average daily traffic

N/A = not applicable

**Table F: 2035 Highway Traffic Volumes**

Roadway Link	No Build		Build Alternative 1		Build Alternative 2	
	ADT	Truck ADT	ADT	Truck ADT	ADT	Truck ADT
SR-91 from SR-241 to SR-71	325,200	18,900	334,800	19,400	361,900	21,000
SR-91 from SR-71 to I-15	305,900	16,800	307,000	16,900	344,700	19,000
SR-91 east of I-15	273,200	21,900	267,400	21,400	282,200	22,600
I-15 north of SR-91	319,800	31,700	333,000	33,000	334,900	33,200
I-15 south of SR-91	336,900	20,600	348,000	21,200	353,200	21,600

Source: PB, April 2009.

ADT = average daily traffic

N/A = not applicable

**Table G: 2015 A.M. Intersection LOS**

Intersection	No Build		Build Alternative 1		Build Alternative 2	
	Delay	LOS	Delay	LOS	Delay	LOS
1. Green River Rd/SR-91 WB Ramps	89.4	F	39.9	D	60.9	E
2. Green River Rd/SR-91 EB Ramps	31.2	C	30.8	C	32.2	C
3. Auto Center Dr/SR-91 WB Ramps	31.7	C	33.1	C	38.3	D
4. Maple St/Pomona Dr	31.4	C	42.1	D	69.7	E
5. 6th St/SR-91 EB Ramps	21.1	C	20.5	C	24.4	C
6. Paseo Grande/6th St	34.3	C	32.7	C	31.1	C
7. SR-91 WB Ramps/Pomona Rd	40.0	D	72.5	E	67.5	E
8. Lincoln Ave/SR-91 EB Ramps	24.8	C	100.0	F	91.1	F
9. Main St/Grand Blvd	32.6	C	31.0	C	30.5	C
10. Main St/SR-91 WB Ramps	27.9	C	18.2	B	20.1	C
11. Main St/3rd St	56.9	E	68.0	E	68.5	E
12. McKinley St/Griffin Way	27.9	C	28.8	C	31.7	C
13. McKinley St/Sampson Ave	33.5	C	26.4	C	25.4	C
14. Pierce St/Magnolia Ave	35.4	D	32.7	C	32.5	C
15. Hamner Ave/Hidden Valley Pkwy	46.5	D	47.7	D	46.2	D
16. Rimpau Ave/Magnolia Ave	54.6	D	55.0	D	55.4	E
17. El Sobrante/Magnolia Ave	72.9	E	70.2	E	71.5	E
18. I-15 SB Ramps/Magnolia Ave	45.1	D	47.5	D	45.1	D
19. I-15 SB Ramps/Ontario Ave	78.9	E	91.3	F	75.2	E
20. Bedford Canyon/Cajalco Road	45.3	D	43.1	D	50.6	D

Source: PB, April 2009.

Delay = Stopped time delay at intersection in seconds

LOS = Level of service



**Table H: 2015 P.M. Intersection LOS**

Intersection	No Build		Build Alternative 1		Build Alternative 2	
	Delay	LOS	Delay	LOS	Delay	LOS
1. Green River Rd/SR-91 WB Ramps	30.6	C	31.5	C	27.7	C
2. Green River Rd/SR-91 EB Ramps	96.2	F	104.7	F	129.6	F
3. Auto Center Dr/SR-91 WB Ramps	18.6	B	18.0	B	17.4	B
4. Maple St/Pomona Dr	40.2	D	38.6	D	36.8	D
5. 6th St/SR-91 EB Ramps	85.0	F	35.1	D	36.9	D
6. Paseo Grande/6th St	43.7	D	48.7	D	60.5	E
7. SR-91 WB Ramps/Pomona Rd	40.0	D	25.8	C	27.1	C
8. Lincoln Ave/SR-91 EB Ramps	146.1	F	98.4	F	107.4	F
9. Main St/Grand Blvd	86.1	F	86.3	F	84.6	F
10. Main St/SR-91 WB Ramps	81.0	F	63.8	E	64.1	E
11. Main St/3rd St	42.4	D	60.9	E	59.6	E
12. McKinley St/Griffin Way	52.3	D	56.1	E	73.1	E
13. McKinley St/Sampson Ave	42.3	D	43.7	D	50.0	D
14. Pierce St/Magnolia Ave	94.7	F	93.1	F	87.5	F
15. Hamner Ave/Hidden Valley Pkwy	85.0	F	99.1	F	93.0	F
16. Rimpau Ave/Magnolia Ave	50.1	D	52.6	D	49.4	D
17. El Sobrante/Magnolia Ave	28.3	C	28.7	C	26.8	C
18. I-15 SB Ramps/Magnolia Ave	85.1	F	89.3	F	90.4	F
19. I-15 SB Ramps/Ontario Ave	37.7	D	37.3	D	36.0	D
20. Bedford Canyon/Cajalco Road	58.0	E	59.0	E	58.7	E

Source: PB, April 2009.

Delay = Stopped time delay at intersection in seconds

LOS = Level of service

**Table I: 2035 A.M. Intersection LOS**

Intersection	No Build		Build Alternative 1		Build Alternative 2	
	Delay	LOS	Delay	LOS	Delay	LOS
1. Green River Rd/SR-91 WB Ramps	84.9	F	73.9	E	79.1	E
2. Green River Rd/SR-91 EB Ramps	42.6	D	39.1	D	41.5	D
3. Auto Center Dr/SR-91 WB Ramps	82.0	F	64.4	E	59.4	E
4. Maple St/Pomona Dr	79.2	E	67.1	E	79.6	E
5. 6th St/SR-91 EB Ramps	24.4	C	28.3	C	23.8	C
6. Paseo Grande/6th St	38.0	D	38.3	D	36.1	D
7. SR-91 WB Ramps/Pomona Rd	40.5	D	97.3	F	82.8	F
8. Lincoln Ave/SR-91 EB Ramps	36.1	D	181.1	F	167.6	F
9. Main St/Grand Blvd	36.0	D	41.9	D	38.8	D
10. Main St/SR-91 WB Ramps	25.2	C	42.8	D	17.4	B
11. Main St/3rd St	61.9	E	79.0	E	36.3	D
12. McKinley St/Griffin Way	33.8	C	31.3	C	33.1	C
13. McKinley St/Sampson Ave	43.5	D	46.0	D	40.4	D
14. Pierce St/Magnolia Ave	58.1	E	46.4	D	49.6	D
15. Hamner Ave/Hidden Valley Pkwy	191.9	F	187.7	F	175.4	F
16. Rimpau Ave/Magnolia Ave	133.0	F	115.9	F	117.0	F
17. El Sobrante/Magnolia Ave	160.7	F	163.4	F	156.7	F
18. I-15 SB Ramps/Magnolia Ave	111.5	F	114.7	F	106.7	F
19. I-15 SB Ramps/Ontario Ave	75.2	E	59.7	E	58.1	E
20. Bedford Canyon/Cajalco Road	28.0	C	27.5	C	28.0	C

Source: PB, April 2009.

Delay = Stopped time delay at intersection in seconds

LOS = Level of service

**Table J: 2035 P.M. Intersection LOS**

Intersection	No Build		Build Alternative 1		Build Alternative 2	
	Delay	LOS	Delay	LOS	Delay	LOS
1. Green River Rd/SR-91 WB Ramps	29.8	C	31.8	C	32.0	C
2. Green River Rd/SR-91 EB Ramps	158.4	F	163.3	F	144.8	F
3. Auto Center Dr/SR-91 WB Ramps	19.7	B	22.4	C	14.3	B
4. Maple St/Pomona Dr	49.9	D	22.7	C	45.8	D
5. 6th St/SR-91 EB Ramps	97.2	F	36.0	D	38.4	D
6. Paseo Grande/6th St	65.2	E	47.2	D	56.0	E
7. SR-91 WB Ramps/Pomona Rd	30.2	C	30.6	C	32.7	C
8. Lincoln Ave/SR-91 EB Ramps	68.3	E	123.1	F	133.5	F
9. Main St/Grand Blvd	124.3	F	97.0	F	152.7	F
10. Main St/SR-91 WB Ramps	141.3	F	119.2	F	37.8	D
11. Main St/3rd St	68.8	E	109.2	F	75.3	E
12. McKinley St/Griffin Way	69.1	E	72.5	E	71.4	E
13. McKinley St/Sampson Ave	60.5	E	71.3	E	72.4	E
14. Pierce St/Magnolia Ave	183.3	F	141.1	F	136.4	F
15. Hamner Ave/Hidden Valley Pkwy	178.6	F	189.8	F	184.6	F
16. Rimpau Ave/Magnolia Ave	91.4	F	83.1	F	81.2	F
17. El Sobrante/Magnolia Ave	202.8	F	141.5	F	141.7	F
18. I-15 SB Ramps/Magnolia Ave	156.4	F	141.7	F	140.3	F
19. I-15 SB Ramps/Ontario Ave	37.7	D	35.1	D	35.2	D
20. Bedford Canyon/Cajalco Road	208.7	F	185.3	F	211.0	F

Source: PB, April 2009.

Delay = Stopped time delay at intersection in seconds

LOS = Level of service

### Daily Vehicle Emission Changes Due to the Proposed Project

The traffic study (PB, April 2009) calculated the daily vehicle miles traveled (VMT) and daily vehicle hours traveled (VHT) for all the vehicle trips along the SR-91 corridor and within the project region. This traffic data, in conjunction with the EMFAC2007 emission model, was used to calculate the PM<sub>2.5</sub> and PM<sub>10</sub> exhaust, tire wear, and brake wear emissions for each of the project alternatives. EMFAC2007 does not estimate road dust emissions; therefore, the emission rates listed in Section 13.2.1 of EPA's AP-42 were used to calculate the road dust PM<sub>2.5</sub> and PM<sub>10</sub> emissions under each alternative. The exhaust and dust emissions generated along the SR-91 corridor are listed in Tables K and L for PM<sub>2.5</sub> and PM<sub>10</sub>, respectively. The exhaust and dust emissions generated within the RCTC region are listed in Tables M and N for PM<sub>2.5</sub> and PM<sub>10</sub>, respectively. The results of the modeling are provided in Attachment A. As shown in Tables K and L, implementation of both project alternatives would result in a net increase in PM<sub>2.5</sub> and PM<sub>10</sub> emissions in 2015 and 2035 along the SR-91 corridor. However, as shown in Tables M and N, implementation of both build alternatives would result in a net decrease in regional PM<sub>2.5</sub> and PM<sub>10</sub> emissions in 2015 and 2035. Therefore, the proposed project would not delay the attainment of the PM<sub>2.5</sub> or PM<sub>10</sub> air quality standards within the Basin.

**Table K: Daily PM<sub>2.5</sub> Emissions along SR-91 Corridor (pounds per day)**

Traffic Condition	Exhaust Emissions	Tire Wear	Brake Wear	Road Dust	Total	Change from No Build
Existing	1,054	64	128	5,435	6,680	-
2015 No Build	776	78	151	6,368	7,374	-
2015 Alt 1	813	80	153	6,862	7,908	534
2015 Alt 2	813	80	153	6,860	7,906	532
2035 No Build	808	97	196	8,310	9,411	-
2035 Alt 1	813	98	197	8,361	9,469	58
2035 Alt 2	816	98	197	8,389	9,501	90

Source: LSA Associates, Inc., July 2009.

**Table L: Daily PM<sub>10</sub> Emissions along SR-91 Corridor (pounds per day)**

Traffic Condition	Exhaust Emissions	Tire Wear	Brake Wear	Road Dust	Total	Change from No Build
Existing	1,143	254	330	57,446	59,172	-
2015 No Build	1,030	312	408	68,813	70,563	-
2015 Alt 1	1,091	320	416	72,535	74,363	3,800
2015 Alt 2	1,091	320	416	72,509	74,336	3,773
2035 No Build	873	389	504	87,838	89,604	-
2035 Alt 1	878	392	507	88,383	90,160	556
2035 Alt 2	881	393	509	88,679	90,461	857

Source: LSA Associates, Inc., July 2009.

**Table M: Daily PM<sub>2.5</sub> Emissions in Project Region (pounds per day)**

<b>Traffic Condition</b>	<b>Exhaust Emissions</b>	<b>Tire Wear</b>	<b>Brake Wear</b>	<b>Road Dust</b>	<b>Total</b>	<b>Change from No Build</b>
Existing	44,477	2,342	4,707	199,975	251,502	-
2015 No Build	27,788	2,747	5,229	234,547	270,310	-
2015 Alt 1	27,782	2,746	5,227	234,498	270,253	-57
2015 Alt 2	27,775	2,745	5,226	234,439	270,185	-125
2035 No Build	26,801	3,227	6,487	275,579	312,095	-
2035 Alt 1	26,787	3,226	6,484	275,443	311,940	-155
2035 Alt 2	26,798	3,227	6,486	275,547	312,058	-37

Source: LSA Associates, Inc., July 2009.

**Table N: Daily PM<sub>10</sub> Emissions in Project Region (pounds per day)**

<b>Traffic Condition</b>	<b>Exhaust Emissions</b>	<b>Tire Wear</b>	<b>Brake Wear</b>	<b>Road Dust</b>	<b>Total</b>	<b>Change from No Build</b>
Existing	48,448	9,332	12,125	2,113,795	2,183,700	-
2015 No Build	37,304	10,945	14,222	2,479,231	2,541,702	-
2015 Alt 1	37,296	10,943	14,219	2,478,711	2,541,169	-533
2015 Alt 2	37,286	10,940	14,215	2,478,088	2,540,530	-1,172
2035 No Build	28,947	12,909	16,710	2,912,956	2,971,521	-
2035 Alt 1	28,932	12,903	16,701	2,911,511	2,970,047	-1,474
2035 Alt 2	28,943	12,907	16,708	2,912,610	2,971,168	-353

Source: LSA Associates, Inc., July 2009.

## CONCLUSION

Transportation conformity is required under Section 176(c) of the federal CAA to ensure that federally supported highway and transit project activities are consistent with the purpose of the SIP. Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant AAQS. As required by the 2006 Final Rule, this qualitative PM<sub>2.5</sub> and PM<sub>10</sub> hot-spot analysis demonstrates that this project meets the CAA conformity requirements to support State and local air quality goals with respect to potential localized air quality impacts.

It is not expected that changes to PM<sub>2.5</sub> and PM<sub>10</sub> emissions levels associated with the proposed DR-91 CIP build alternatives would result in new violations of the NAAQS for the following reasons:

- The traffic volumes in the vicinity of the Norco and Anaheim air quality monitoring station are consistent with the existing traffic volumes along I-15 and SR-91.
- The ambient PM<sub>10</sub> concentrations at the Norco station exceeded the 24-hour federal standard once within the past five years and is projected to be 52 percent of the NAAQS by 2015.
- Based on the local monitoring data and the 2007 AQMP, the 24-hour and annual average PM<sub>2.5</sub> concentrations in the project area would be reduced to below the federal 24-hour and annual NAAQS by 2015.
- Both build alternatives would result in a net decrease in PM<sub>2.5</sub> emissions within the Basin.
- Both build alternatives would result in a net decrease in PM<sub>10</sub> emissions within the Basin.

For these reasons, future new or worsened PM<sub>2.5</sub> and PM<sub>10</sub> violations of any standards are not anticipated; therefore, the proposed SR-91 CIP meets the conformity hot-spot requirements in 40 CFR 93-116 and 93-123 for both PM<sub>2.5</sub> and PM<sub>10</sub>.

## REFERENCES

United States Environmental Protection Agency. 2006. "Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas" (EPA 420-B-06-902, March 2006).

United States Environmental Protection Agency. 2006. Final Revisions to the National Ambient Air Quality Standards for Particulate Pollution (Particulate Matter). EPA Web site: [www.epa.gov/oar/particulatepollution/naaqsrev2006.html](http://www.epa.gov/oar/particulatepollution/naaqsrev2006.html), accessed on March 19, 2007.

State Route 91 Corridor Improvement Project Traffic Study, (Parsons Brinckerhoff, April 2009).

**ATTACHMENT A**

**PM<sub>2.5</sub> AND PM<sub>10</sub> EMISSION CALCULATIONS**